permutations, and probabilities. The earlier chapters are quite within the comprehension of a schoolboy with a moderate knowledge of arithmetic ; the appendices, which treat of distributions, derangements, the disadvantage of gambling, and a proof of the Binomial Theorem, founded purely on the doctrine of combinations, require some knowledge of algebra in the reader. So great is the clearness with which Mr. Whitworth states and explains the problems throughout, that it is almost impossible to misunderstand him. The appendix in which the disadvantage of gambling is demonstrated is very interesting, and often novel ; and his explanation of the Petersburg problem is the most satisfactory which we have met.

Our only regret concerning the work is that Mr. Whitworth has not attempted more. Though the doctrines of combinations and probabilities lie at the basis of all mathematical and physical science, their value is chiefly theoretical, and it is hardly likely that time can be spared for their study in a school education. Had Mr. Whitworth enlarged his work so as to make it a pretty complete handbook of the theory of probabilities, he would have performed a great service to science. It is strange how little attention has been paid at Cambridge to the theory of probabilities. If we except Mr. Todhunter's valuable history, and Mr. Airy's special work upon its application to observations, we cannot call to mind any recent separate work devoted to rendering the subject of probabilities accessible to students. Mr. De Morgan's article in the Encyclopædia Metropolitana, his excellent work in the Cabinet Cyclopædia, the Useful Knowledge Society's essay, Galloway's treatise, and the translations of Quetelet's work, are what we have to depend upon as introductions to the subject ; but they are all twenty or thirty years old at least, and difficult to meet with. Mr. Venn's logic of chance, being purely metaphysical, is not to be counted. We wish that Mr. Whitworth, or some mathematician at once as able, and possessed of as clear a style of exposition, would fill this gap in mathematical literature by producing a student's handbook of probabilities, including the theory of errors, the method of least squares, &c., with some of the applications to practice.

W. S. JEVONS

OUR BOOK SHELF

F. Hoppe-Seyler. Handbuch der physiologischen u. pathologischen Analyse. Third edition. (Berlin, 1870.)

WHILST modern chemical literature is abundantly supplied with publications on the analysis of mineral substances, works on the methods of chemical investigation of the products of animal life are comparatively few. Physiological chemistry is still in its infancy. By far the greatest number of the substances occurring in the animal body have as yet to be discovered, and even those already known exhibit but in few instances such characteristic reactions as serve for their detection and quantitative estimation equal in reliability to those we find in mineral chemistry. But however incomplete the analytical methods of the physiological chemist may be, they are highly valuable, not merely from a scientific, but also from a practical point of view, inasmuch as they aid the physician in the detection of those important changes in the chemical composition of animal fluids and excreta, which almost invariably accompany certain forms of disease. The scientific man as well as the medical practitioner will, therefore, take an equal interest in the re-publication in an enlarged form of a work on the application of chemical analysis to physiology and pathology, which has proved very valuable in its former editions.

The "Handbook" of Mr. Hoppe-Seyler's is adapted to the use of the advanced medical student as well as of the physician. That part of the book treating on the analysis, properly speaking, of animal fluids, tissues, &c., is preceded by some very useful chapters on the employment of chemical and physical apparatus ; on re-agents and the mode of ascertaining the purity of the same ; and on the composition, the properties, and detection of inorganic and organic chemical compounds occurring in the animal body. The great attention paid to the optical properties, of the various substances occurring in the body to the methods of their examination by means of the polariscope and spectroscope, forms a very remarkable and important feature of the book. Physiological chemistry claims a large share of the results which natural science owes to the application of these instruments, and a more extensive use of optical methods of research will certainly lead to further important discoveries. The author does not include the analysis of gaseous products, nor does he give an account of the methods used for the detection of poisons. The detection of blood-spots on wood, cloth, &c., is treated in an appendix. A chromolithograph, representing the spectra of the alkali metals, the absorption bands of hæmoglobine, and various tables and engravings, contribute to the usefulness of the work.

B. FINKELSTEIN

Search for Winter Sunbeams in the Raviera, Corsica, Algiers, and Spain. With numerous illustrations. By Samuel S. Cox. (London : Sampson Low, Son, and Marston. New York : D. Appleton and Co.)

THIS interesting book will be welcome to those who are seeking to find a home in a sunnier clime than our own The author points out the beauties and the medicinal qualities of the south. In his preliminary chapter he explains the title, "Sunbeams," giving the functions of light, music of light, analogy between light and sound, speaking especially of the life-giving power of the golden sunbeam. Quoting Prof. Maury's thoughts on light, he says, "that the organs of the human ear are so ordered that they cannot comprehend colour any more than the eyes can see sounds ; yet, that we may hear over again the song of the morning stars, for light has its gamut of music ! The high notes vibrate with the violet of the spectrum, and the red extremity sounds the bass ; and though the ear may not catch the song that the rose, lily, and violet sing, it may, for aught we know, be to the humming-bird the butterfly, and the bee, more enchanting than that which 'Prospero's Ariel' sung to the shipwrecked mariner."

The author rapidly describes the well-known winter resorts, Nice, Mentone (of which, with its lovely flowers and fruits, he draws a most inviting picture), Monaco, with its roulette table, myths, and beautiful scenery; then comes Corsica, its chief town, Ajaccio, being renowned as the birthplace of Napoleon. Many interesting facts are here given of his mother, Madame Letitia, with incidents of his boyhood. The author then proceeds to Africa, passing through Algiers, visits the Kabyle people and Arabs, giving a description of the Blidah orange orchards, Algerine desert, the magnificent cedars and oaks on Mount Atlas, the Arab and Moorish women, different interesting old tombs, mosaics, and inscriptions. Our author travels on to Spain and compares it with Algiers.

Arrived at Murcia he witnesses a bull-fight, then he visits the Alhambra with its graceful architecture ; *en route* for Madrid he passes many curious towns and castles. The following is a description of one :—"A mist obscured the mountains above. That old Moorish castle near the hill of the Pharos is called the Alcazaba. Its Puerta de la Cava is renowned, if not in history, in legend, as the scene of the suicide of Count Julian's daughter, whose woes brought on the Moorish invasion, and whose Iliad has been sung in prose by Irving. This castle is hid under a veil, even as Irving dropped over its rigid outlines the drapery of his genius. . . . The mist lifts a little. We see a streak of sunlight on a bleak, bright mountain ahead of us. We pass by gardens of immense fig-trees. The mountains begin to shine

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